

AUG. 26. 2008 7:40AM

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NO. 1691 P. 7

AUG 26 2008

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:

ROGER MOONS

CASE AD6883USNA  
NO.:

APPLICATION NO.: 10/627902

GROUP ART UNIT: 1761

FILED: JULY 25, 2003

EXAMINER: DREW E. BECKER  
CONFIRMATION NO.: 3469

FOR: IMPROVED THERMOPLASTIC POLYMERIC OVENWARE

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. 1.132

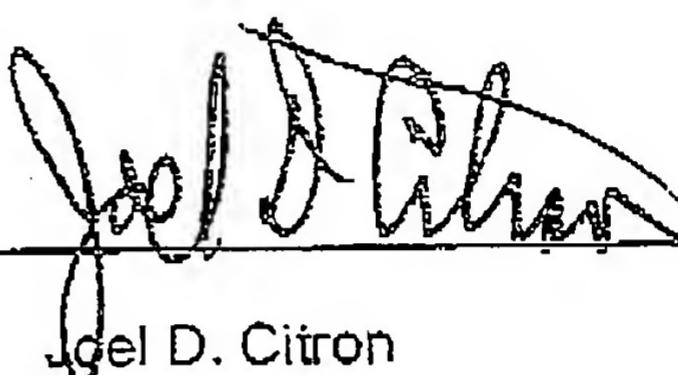
1. I obtained a B.S. in Chemistry from the Polytechnic Institute of Brooklyn in 1962 and a Ph.D. in Organic Chemistry from the University of California at Davis in 1967.
2. I am currently receiving a pension from the assignee of this application E.I. DuPont de Nemours & Co., Inc. (hereinafter DuPont).
3. I am a Registered Patent Agent (No. 33,852).
4. I am currently a consultant for DuPont on technical and patent matters.
5. While consulting for DuPont I directed an experiment as set forth below.
6. A composition containing 55 weight percent of Zenite® 6000 Liquid Crystalline Polymer (available from E. I. DuPont de Nemours & Co., Inc., Wilmington, DE 19998 USA), 37 weight percent talc, and 8 weight percent carbon fiber was prepared by melt mixing in a 30 mm Werner & Pfleiderer twin screw extruder. The techniques used to prepare this composition were similar to those commonly used to prepare other compositions containing LCPs.
7. The above composition was molded in a 6 oz. HPM injection molding machine into 4 inch diameter disks.

Application No.: 10/627902  
Docket No.: AD6883USNA

Page 2

8. An above described disk (after machining) was tested for through plane thermal conductivity. The resulting value was 0.368 W/m°K.

9. The attached pages from Electronic Research Notebooks D100052 and D100008 describe this experiment and the conditions used for the various operations. The sample number for the above described composition was 13-1. The composition of sample 13-2 has been blanked out from the page, and the results for the thermal conductivity of this sample have been omitted.



Joel D. Citron

Date: May 2, 2007

T:\Patent Documents\Eng. Polymers\AD-6883\AD6883\AD6883 Declaration of Joel Citron.doc



## DuPont Electronic Laboratory Notebook

Identification Number : D100052-28.01

Experiment Name : D100052-13

Program Name : Zenite

Project Name: Thermoconductivity for Joel Citron

Document Name : D100052-13 series Thermal Conductive Zenite Joel Citron.pdf

Site Name : EIP ST

Business Unit : Engineering Polymers

Author Name : Mike J. Molitor

Date : 02/26/2007 14:59:57

Co-Author Details :

Witness Name : Adcock, Dave

Date : 02/26/2007 15:03:04

| Date (GMT)            | Signed by   |
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| 2/26/2007 07:59:57 PM | Name: Mike J. Molitor<br>Pre-Sig Hash: 9b9c723fedbb8ec913753be9ae4abc415c4f0f21   |
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NO. 1691 P. 10

Sample # D100052  
 Zenite 6000  
 Jetfil Talc 575C  
 Carbon fiber Sigratil

13-1      13-2  
 55  
 37  
 6

E. I. du Pont de Nemours & Company

|  |               |                       |
|--|---------------|-----------------------|
| DATE 10/26/08                                    | TIME 10:45 AM | TECHNICAL SALES NOTES |
| RESEARCHER M. J. KATHOL                          | NOTES         | REMARKS               |
| BARREL 1 300V                                    |               |                       |
| BARREL 2 300V                                    |               |                       |
| BARREL 3 300V                                    |               |                       |
| BARREL 4 300V                                    |               |                       |
| INTERLAYER CHECKOUT                              |               |                       |
| PIN STABILIZER ADJUSTED                          |               |                       |
| PLATE EQUIPMENT TESTED                           |               |                       |
| PLATE POSITION                                   |               |                       |
| SAMPLE 1 13-1                                    |               |                       |
| TIME   |               |                       |
| SET PT 1 ACTUAL INGESTION TIME AND THERMAL CYCLE |               |                       |
| BARREL 1 300V 200 23.2                           |               |                       |
| BARREL 2 300V 200 23.2                           |               |                       |
| BARREL 3 300V 200 23.2                           |               |                       |
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| SCREW  |               |                       |

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NO. 1691 P. 11

 DuPont Electronic Laboratory Notebook

Identification Number : D100008 32.02

Experiment Name : D100008-18

Program Name : Zenite

Project Name: Thermal Conductivity

Document Name : ThermalConductivityofD100052-13-1ab813-2.pdf

Site Name : EXP ST

Business Unit : Engineering Polymers

Author Name : Adcock, Dave

Date : 02/26/2007 12:57:03

Co-Author Details :

Witness Name : Harvey, Pat A.

Date : 02/26/2007 13:07:04

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| 2/26/2007 05:57:03 PM | Name: Adcock, Dave<br>Pre-Sig Hash: 73b0cadcc1bdedf8234bdc54d81ae2e301af81ba<br>By entering your password you verify that you planned and/or executed the work, directed the work, analyzed the results, or drew the conclusions described within this document. |
| 2/26/2007 06:07:04 PM | Name: Harvey, Pat A.<br>Pre-Sig Hash: 73b0cadcc1bdedf8234bdc54d81ae2e301af81ba<br>By entering your password you will be signing to say that you have witnessed the information contained in this document.   |

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NO. 1691 P. 13

• अस्ति देवता विद्यम् ॥

2015-5-27 3:00

SAHARA 10-12-13  
SAHARA 10-12-13 3030

Average sample frequency = 500; Controller= 30 °C

| TR (C) | TG (C) | TL (C) | TR + TG + TL (C) | Q     | RATIO    |
|--------|--------|--------|------------------|-------|----------|
| 50.0   | 45.2   | 42.4   | 137.6            | 39.64 | 0.22221  |
| 60.0   | 55.0   | 49.6   | 164.6            | 39.75 | 0.198887 |
| 60.0   | 48.1   | 40.9   | 149.0            | 39.73 | 0.195166 |

Average sample concentration (%): Categories 35 Q

| EX. (C) | EG. (C) | EE. (C) | EF. (C) | EF. (C) | E       | ratio    |
|---------|---------|---------|---------|---------|---------|----------|
| 78.4    | 75.5    | 53.4    | 49.2    | 38.74   | 6854.4  | 0.233231 |
| 85.2    | 72.0    | 85.6    | 24.7    | 39.83   | 30351.7 | 0.193207 |
| 85.2    | 72.0    | 85.6    | 54.7    | 39.62   | 10357.6 | 0.193013 |

~~USING CAPTURED FILE XSL04200~~  
~~USING TEST FILE~~

USING FIRST ORDER EQUATIONS

|                  |             |
|------------------|-------------|
| SAMPLE ID        | 15-1        |
| SAMPLE THICKNESS | 3.000 mm    |
| CTA              | 0.000000000 |

THE SPHERE HAS A THERMAL SENSITIVITY OF 3.85154E-001 W/M  
AND A THERMAL RESISTANCE OF 4.55520E-003 K/W  
AT A TEMPERATURE OF 50.55 C.

THE DELTA T THROUGH THE SAMPLE IS  
THE LARGER TEMPERATURE IS  
THE DELTA T BEFORE THE STACK IS  
THE GREATEST TEMPERATURE IS

273

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THE EXAMPLE HAS A THERMAL CONDUCTIVITY OF 5.702624E-001 W/MK  
AND A THERMAL RESISTANCE OF 5.12335E-003 K/W

THE BELT IS THROWN OVER THE SPOOL IS  
THE BELT TEMPERATURE IS  
THE BELT ACROSS THE SPACK IS  
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# DuPont Electronic Laboratory Notebook

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Identification Number : D100052-28.01

Project Name : D1D0052-13

Document Name : Gerjte

Project Name: Thermoprotectivity for Joel Citron

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Page 20 of 20

Synthesis of Conducting Polymers

Mike T. Molaison

Date : 03/26/2007 14:59:57

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CONSTITUTION OF THE STATE

**Witness Name : Adcock, Dave**

Date : 02/26/2007 15:03:04

|                             |  |                            |
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| Witness Name : Adcock, Dave |  | Date : 02/26/2007 15:03:04 |
| Date (GMT)                  | Signed by  |                            |
| 2/26/2007 07:55:57 PM       | Name: Mike J. Molitor<br>Pre-Sig Hash: 9b9c723fadb2ec913753ba9ae45bc415e4f0fa1<br>By entering your password you verify that you planned and/or executed<br>the work, directed the work, analyzed the results, or drew the conclusions<br>described within this document. |                            |
| Justification               |  |                            |

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| 2/26/2007 08:03:05 PM | Name: Adcock, Dave<br>Pre-Sig Hash: 4004778267dafffeaed9d10dd217ba3081785b91<br>by entering your password you will be signing to say that you have<br>witnessed the information contained in this document |
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NO. 1691 P. 15

|                       |      |      |
|-----------------------|------|------|
| Sample # D100052      | 13-1 | 13-2 |
| Zenite 6000           | 55   |      |
| Jetfil Talc 575G      | 37   |      |
| Carbon fiber Sigmafil | 8    |      |

57 mi. N.E.

| BOOK PAGE                 | E. I. du Pont de Nemours and Company |                |       |      |                       |                   |                      |      |       |
|---------------------------|--------------------------------------|----------------|-------|------|-----------------------|-------------------|----------------------|------|-------|
| 1011-6 DE A MELT PROCESS  |                                      | DATE 10-30-66  |       |      |                       |                   |                      |      |       |
| E 111563- 36              | NUMBER                               | RECORD         |       |      |                       |                   |                      |      |       |
| MR NO 4272 NB NO 2 110853 | DATE 10-30-66                        | CYLINDER 6 92  |       |      |                       |                   |                      |      |       |
| POLYMER TYPE F-1412       | CHARGE SIZE 5.1                      | RAM SPEED 94.7 |       |      |                       |                   |                      |      |       |
| MOLD 20 MM (F-1)          | SCREW SPEED -                        | SCREW PRESS -  |       |      |                       |                   |                      |      |       |
|                           | NOZLE 2 92                           | GATE PRESS -   |       |      |                       |                   |                      |      |       |
| SAMPLE NO                 | REAR                                 | CENTER         | FRONT | MOLD | WALL<br>TEMP<br>A B C | PIPE<br>TEMP<br>H | PRESS.<br>100000 PSI | PIST | SLASH |
| 12-1                      | 325                                  | 352            | 352   | 345  | 160 160 160           | 15 15             | 345 345              | 205  | 363   |

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NO. 1691 P. 16

**DUPONT** DuPont Electronic Laboratory Notebook

Identification Number : D100052-29.01

Experiment Name : D100052-13

Program Name : Zenite

Project Name:Thermocconductivity for Joel Citron

Document Name : D100052-13 series Thermal Conductive Zenite Joel Citron.pdf

Site Name : EXP ST

Business Unit :Engineering Polymers

Author Name : Mike J. Molitor

Date : 02/26/2007 14:59:57

Co-Author Details :

Witness Name : Adcock, Dave

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| Date (GMT)            | Signed by   |
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| 2/26/2007 07:59:57 PM | Name: Mike J. Molitor<br>Pre-Sig Hash: 9b9c723fedbb8ec913753be9ac4abc415c4f0fa1   |
| Justification         | By entering your password you verify that you planned and/or executed the work, directed the work, analyzed the result, or drew the conclusions described within this document. |

|                       |   |
|-----------------------|---|
| 2/26/2007 08:03:05 PM | Name: Adcock, Dave<br>Pre-Sig Hash: e004778267dalf14acd9d10dd217ba3031785b91  |
| Justification         | By entering your password you will be signing to say that you have witnessed the information contained in this document |

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|               | Name:<br>Pre-Sig Hash: |
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AUG. 26. 2008 7:42AM

NO. 1691 P. 18

|                       |      |      |
|-----------------------|------|------|
| Sample # D100052      | 13-1 | 13-2 |
| Zenite 6000           | 55   |      |
| Jetfil Talc 575C      | 37   |      |
| Carbon fiber Sigmatex | 8    |      |

| L-100 Part No. Identification |                          | Comments    |                     | Date     |
|-------------------------------|--------------------------|-------------|---------------------|----------|
| LINE                          | ITEM                     | DESCRIPTION | NOTES               |          |
| 1                             | BARREL                   | SCREW       | SCREW               | 11/12/91 |
| 2                             | DIE                      | SIZE        | ADAPTER             |          |
| 3                             | POLYMER                  | PCV         | TRAY                |          |
| 4                             | INTERLOCKS CHECKED       |             | TRAY CODE           |          |
| 5                             |                          |             | RUX STOCK INVENTORY |          |
| 6                             | AUXILIARY EQUIPMENT USED |             |                     |          |
| 7                             | TIME                     |             |                     |          |
| 8                             | SAMPLES                  | 1           | 2                   |          |
| 9                             | TIME                     | ESTIMATED   | ACTUAL              | ACTUAL   |
| 10                            | BARREL 1                 | 3.00        | 3.02                | 3.03     |
| 11                            | BARREL 3                 | 3.00        | 3.09                | 3.07     |
| 12                            | BARREL 2                 | 3.00        | 3.24                | 3.35     |
| 13                            | BARREL 5                 | 3.00        | 3.01                | 3.00     |
| 14                            | BARREL 6                 | 3.00        | 3.07                | 3.06     |
| 15                            | BARREL 7                 | 3.00        | 3.00                | 3.00     |
| 16                            | BARREL 8                 | 3.00        | 3.01                | 3.04     |
| 17                            | BARREL 9                 | 3.00        | 3.02                | 3.00     |
| 18                            | BARREL 10                |             |                     |          |
| 19                            | BARREL 11                |             |                     |          |
| 20                            | BARREL 12                |             |                     |          |
| 21                            | BARREL 13                |             |                     |          |
| 22                            | DIE                      | 3.00        | 3.01                | 3.02     |
| 23                            | ADAPTER                  |             |                     |          |
| 24                            | EXHAUST SPACER           |             | 3.00                | 3.00     |
| 25                            | TOPOLE                   | 3.00        | 3.02                | 3.01     |
| 26                            | WHEELS 288               | 3.00        | 3.00                | 3.00     |
| 27                            | VACUUM                   |             | 3.00                | 3.00     |
| 28                            | DOOR                     |             |                     |          |
| 29                            | DOV                      |             |                     |          |
| 30                            | PEZZO 1 PPM              |             | 3.00                | 3.00     |
| 31                            | PEZZO 2 PPM              |             | 3.01                | 3.00     |
| 32                            | PEZZO 3 PPM              |             |                     |          |
| 33                            | PUMP GEM                 |             |                     |          |
| 34                            | KATE PPM                 |             | 3.00                | 3.02     |
| 35                            | GARLIC SPOT              |             | 3.04                | 3.06     |
| 36                            | HAND ASST.               |             |                     |          |
| 37                            | CUTTER SPOT              |             |                     |          |
| 38                            | COMMANDS                 |             |                     |          |
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| WORK DATE                                 | E. L. du Pont de Nemours and Company |                   |       |        |                |                |                   |                     |              |                            |
| 10-15                                     | 6 DR A                               | RECEIVED 10-15-62 |       |        |                |                |                   |                     |              |                            |
| E 111563- 36                              | PURPOSE: PEGAS TESTS                 |                   |       |        |                |                |                   |                     |              |                            |
| MR NO./ <u>725</u> NB NO. 0 <u>100062</u> | DATE 10-10-62                        | CYLINDER 6 UZ     |       |        |                |                |                   |                     |              |                            |
| FOR <u>PLASTIC</u>                        | CHARGE/SBU 5-1                       | RAM SPEED 544     |       |        |                |                |                   |                     |              |                            |
| POLYMER TYPE <u>ZC400T</u>                | SCREW C.R.                           | SCREW SPEED -     |       |        |                |                |                   |                     |              |                            |
| IMPROV. <u>8 + 0.04 (E-2)</u>             | NOZZLE 6 F.S.                        | BACK PRESS. 1000  |       |        |                |                |                   |                     |              |                            |
| SAMPLE NO.                                | REAR                                 | CENTER            | FRONT | NOZZLE | LOAD<br>A.T.E. | TEMP<br>C. 110 | STRES<br>C. 110 N | POWDER<br>WEIGHT gm | WEIGHT<br>gm | DATA<br>Kg/cm <sup>2</sup> |
| 13-2                                      | 32.5                                 | 33.2              | 33.2  | 32.9   | 1000           | 100            | 10                | 33.9                | 23.7         | 3635                       |

AUG. 26. 2008 7:42AM

NO. 1691 P. 19


**DuPont Electronic Laboratory Notebook**

Identification Number : D100008 32.02

Experiment Name : D100008-18

Program Name : Benite

Project Name: Thermal Conductivity

Document Name : ThermalConductivityofD100052-13-1end13-2.pdf

Site Name : EXP ST

Business Unit : Engineering Polymers

Author Name : Adcock, Dave

Date : 02/26/2007 12:57:03

Co-Author Details :

|                               |  |                            |
|-------------------------------|--|----------------------------|
| Witness Name : Harvey, Pat A. |  | Date : 02/26/2007 12:57:04 |
| 2/26/2007 05:57:03 PM         | Name: Antoinette, Diane  |                            |
|                               | Pre-Sig Hash: 0e80462017155102d010ed10d530d12902   |                            |
|                               | By entering your password you verify that you planned and/or executed the work, directed the work, analyzed the results, or drew the conclusions described within this document. |                            |
| 2/25/2007 05:07:04 PM         | Name: Harvey, Pat A.   |                            |
|                               | Pre-Sig Hash: 72b0cadec1bdedf8234bdc64d81ae2e301af51ba   |                            |
|                               | By entering your password you will be signing to say that you have witnessed the information contained in this document.   |                            |
|                               | Name:  |                            |
|                               | Pre-Sig Hash:  |                            |
|                               | Name:  |                            |
|                               | Pre-Sig Hash:  |                            |
|                               | Name:  |                            |
|                               | Pre-Sig Hash:  |                            |
|                               | Name:  |                            |
|                               | Pre-Sig Hash:  |                            |

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E.I. du Pont de Nemours and Company



SAMPLE D 15-1  
SAMPLE THICKNESS: 3.030mm

Average sample temperature = 5°C Controller = 30°C

| W (G) | 2E (G) | TL (G) | W (G) | 2E (G) | E       | PACTO    |
|-------|--------|--------|-------|--------|---------|----------|
| 50.0  | 52.2   | 40.5   | 80.0  | 19.6   | 9472.1  | 0.23266  |
| 50.6  | 52.0   | 40.8   | 20.5  | 19.75  | 10085.7 | 0.195657 |
| 50.8  | 48.1   | 40.8   | 20.5  | 19.73  | 10107.2 | 0.195166 |

Connelly 35 C

| W (G) | ZG (G) | IZ (G) | W    | ZG    | IZ      | G        | PATIG. |
|-------|--------|--------|------|-------|---------|----------|--------|
| 78.1  | 65.9   | 53.4   | 49.2 | 18.74 | 6854.5  | 0.233231 |        |
| 85.2  | 72.6   | 55.6   | 56.7 | 19.83 | 30151.7 | 0.193207 |        |
| 63.12 | 72.0   | 65.6   | 54.7 | 19.62 | 10367.3 | 0.193013 |        |

USING CALIBRATION FILTER PSL04200-2  
USING TEST FILTER = 13.4 LGS

प्राचीन लंबाया शिवसंग प्रभा

SAMPLE ID. : 13-1  
SAMPLE THICKNESS : 0.030±0.003  
CURE : 0.000±0.003

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THE SAMPLE HAS A THERMAL CONDUCTIVITY OF 3.8510E-001 W/MK  
AND A THERMAL RESISTANCE OF 5.2940E-003 M2K/W  
AT A TEMPERATURE OF 20.73 °C.

THE DELTA T THROUGH THE SAMPLE IS  
THE HEAT EXCHANGER IS  
THE DELTA T ACROSS THE STACK IS  
THE CHAOS EXCHANGER IS

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TEST SAMPLE HAS A THERMAL CONDUCTIVITY OF 5.702624e-002 W/m  
AND A THERMAL RESISTANCE OF 8.567522e-003 m<sup>2</sup>K/W  
AT A TEMPERATURE OF 75.40 °C.

THE DELTA IS THROUGH THE SAMPLE IS  
THE HEATER TEMPERATURE IS  
THE DELTA T ACROSS THE STAGE IS  
THE GUARD TEMPERATURE IS

1962-8

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335

• 72.02.6

THE SAMPLE HAS A THERMAL CONDUCTIVITY OF 2.651947e-001 W/mK AND A THERMAL RESISTANCE OF 3.550003e-003 m<sup>2</sup>K/W AT A TEMPERATURE OF 20.0°C.

THE DELTA T THROUGH THE SAMPLE IS 2.054°C, THE HEATER TEMPERATURE IS 21.60°C, THE DELTA T ACROSS THE BACK IS 22.92°C, AND THE GUARD TEMPERATURE IS 23.79°C.

SAMPLE ID: 16-1  
SAMPLE THICKNESS: 3.050mm

Average sample temperature = 55.0°C Controller = 30.0°C

| TU (C) | TG (C) | TL (C) | TG (C) | TL (C) | Q       | RATIO    |
|--------|--------|--------|--------|--------|---------|----------|
| 50.0   | 48.2   | 49.4   | 50.8   | 49.64  | 9472.1  | 0.233266 |
| 60.0   | 58.0   | 40.8   | 59.5   | 49.75  | 10095.7 | 0.195657 |
| 60.6   | 48.1   | 40.9   | 29.5   | 49.73  | 10167.1 | 0.195166 |

Average sample temperature = 55.0°C Controller = 55.0°C

| TU (C) | TG (C) | TL (C) | TG (C) | TL (C) | Q       | RATIO    |
|--------|--------|--------|--------|--------|---------|----------|
| 72.1   | 65.9   | 52.4   | 48.5   | 48.74  | 8854.4  | 0.233231 |
| 65.2   | 72.0   | 65.6   | 54.7   | 49.63  | 10381.7 | 0.195207 |
| 65.2   | 72.0   | 60.6   | 54.7   | 49.52  | 10467.3 | 0.195013 |

USING CALIBRATION FILE: ZST04200.CAL

USING FIRST ORDER FIT

USING TEST FILE: ZST04200.CAL

SAMPLE ID: 16-1  
SAMPLE THICKNESS: 3.050mm  
CTE: 0.00024003

THE SAMPLE HAS A THERMAL CONDUCTIVITY OF 2.651947e-001 W/mK AND A THERMAL RESISTANCE OF 3.550003e-003 m<sup>2</sup>K/W AT A TEMPERATURE OF 20.0°C.

THE DELTA T THROUGH THE SAMPLE IS 2.054°C, THE HEATER TEMPERATURE IS 21.60°C, THE DELTA T ACROSS THE BACK IS 22.92°C, AND THE GUARD TEMPERATURE IS 23.79°C.

THE SAMPLE HAS A THERMAL CONDUCTIVITY OF 3.702624e-001 W/mK AND A THERMAL RESISTANCE OF 3.239228e-003 m<sup>2</sup>K/W AT A TEMPERATURE OF 20.0°C.

THE DELTA T THROUGH THE SAMPLE IS 1.962°C, THE HEATER TEMPERATURE IS 21.56°C, THE DELTA T ACROSS THE BACK IS 20.53°C, AND THE GUARD TEMPERATURE IS 22.02°C.